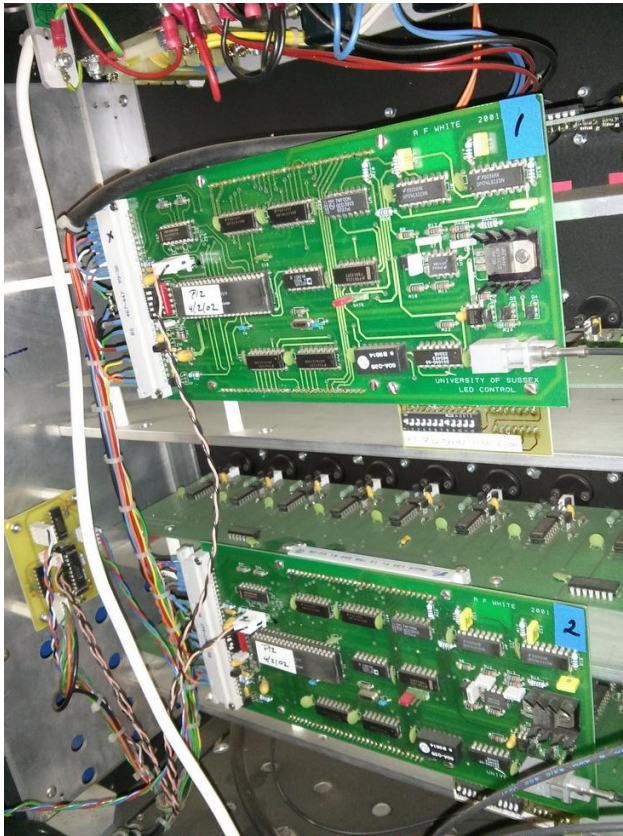# MINOS+ Status Report

Xinjie Qiu
All Experimenters' Meetings
November 11, 2013

Near Detector

- Light Injection (LI) Gain code failing
  - Can't match hits to a LI pulse
  - One new bad LED (PB=0 LED=1) showed up ~ Oct 22, exceeding the maximum allowed number (3) of bad LEDs
  - Temperately increased the bad LED number tolerance from 3 to 4 in the code
  - Opened the front panel of PB(pulser box) to examine how the LI is setup
  - Inspected the LI controller board, no obvious problem found
  - Not immediately clear how and if we can replace a LED or move the fibers from the bad one to a working one
  - Will consult with Phil Adamson, our local LI expert
  - Update this morning: the bad LED number went back from 4 to 3 again.
  - Further investigation is going on

Near Detector

- Mislabeled cable caused missing plane in LI Hit/Gain map
  - A previous attempt was made to fix a hot channel
  - Found some mismatched labels on both end of the master to minder cables
  - Re-cabled them as we believed it was the correct order, but evidently broke the LI readout (LI dynodes connected to the wrong Minders)
  - Put the cables back as they were, plane 101 LI is working again
  - Re-label the connector of the cable on the master end to make them consistent with the minder end, without moving or relabeling any minders.

- Hot channel in 0-17-2
  - High ~210kHz
  - A minder swap was performed, the master crate was power cycled, failed to fix the issue
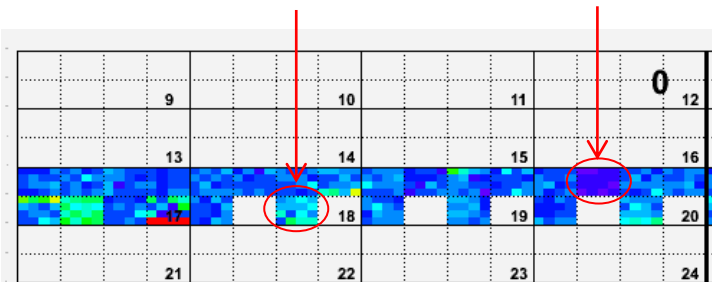 - Will continue the investigation.
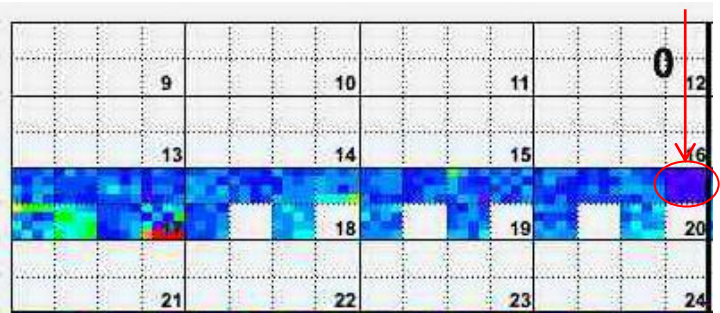
Alner Box Fix

0-18-6   0-20-1

0-20-5

- The problem
  - Low rate on channel 0-18-6 (Type 4 Alner box) and 0-20-1 (Type 5 Alner box)
- Fix of channel 0-18-6
  - Swapped with a spare Type 4 Alner box in 0-18-6
  - Low rate channels became normal.
  - Swapped with a spare Type 5 Alner box in 0-20-1
  - Low rate channels were still there.
- Troubleshooting on 0-20-1
  - Checked on HV card, HV cable, cable from box to minder, etc.
  - Everything seems OK
  - Though maybe a bad spare box, swapped with another spare Type 5 Alner box in 0-20-1
  - Low rate channels were still there.
  - Really confused … another bad spare box?
  - Checked on HV card, HV cable, cable from box to minder, etc. , again
  - Everything seems OK
  - Moved a known good Alner box from 0-20-5 to 0-20-1
  - Previously low rate channel 0-20-1 is OK now
  - Conclusion: The problem was due to "bad" Alner box

Alner Box Fix *(continued)*

PMT Base

PMT

PMT Holder

Optical Fiber

0-20-5

0-20-5
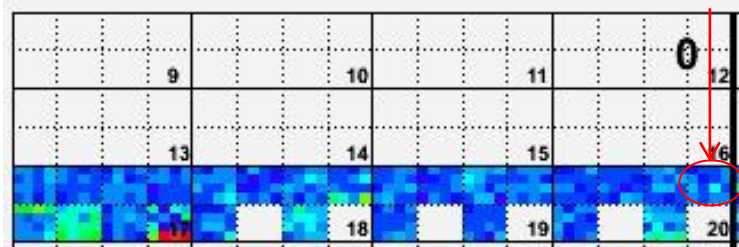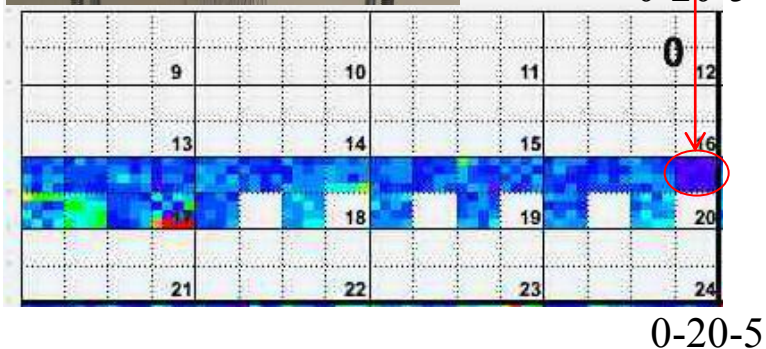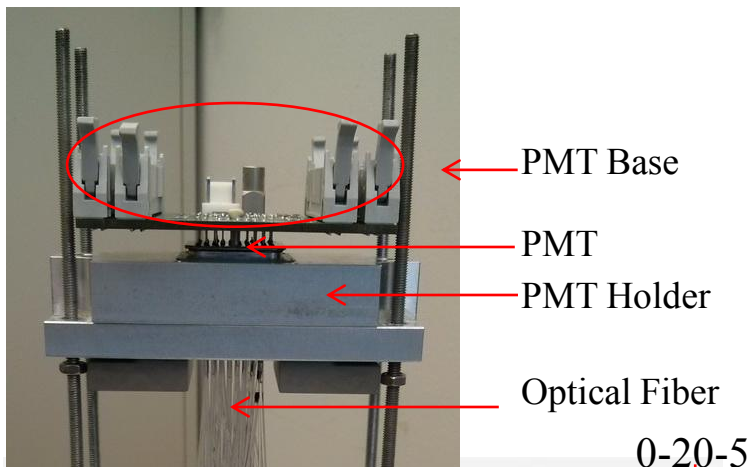
- Alner box repair
  - Retrieved a PMT from one CalDet Alner box to replace the one in the "bad" box
  - Put it back into the detector, problem remained
  - Really confused… Another bad PMT?

- Cause of the problem figured out
  - CalDet box has 1:1 channel readout, Type 5 box has 4:1
  - Thought the multiplexing is done by the cable
  - Measured the cable, it's not the case
  - Consulted with Oxford, multiplexing is done by the PMT **base**
    - CalDet box has regular PMT bases
    - Type 5 box has multiplexed PMT bases
    - 4 anodes are electrically shortened together on the base, a single signal is routed to the connector
  - Non-multiplexed base was used, both the box previously used in the detector and the in two spares
  - Only 1 anode is read out, causing low rate at 1/4 level

- Final fix
  - Opened up the box and indeed the PMT base was not multiplexed
  - Replaced the regular base with a multiplexed one, also made sure PMT stays with its carefully aligned same aluminum holder
  - Installed the box in the detector
  - Online Monitor plots show the channel is normal now!
  - Only have one spare MXP base, Oxford will send us some PMT assemblies spares

Far Detector

- Regular detector maintenance
  - ROP (*Read-Out Processor*) #6 crashes DAQ
    - Changed ROP cards, re-initialize the board
    - ROP06 Card kept failing
    - Eventually replaced it with a new one from ND (ND ROP4)
  - HV Card replacement on mainframe 7
  - DAQ rc
    - FD RC CPU temperature over threshold warnings
    - Fan change on DAQ rc

- FD DAQ running happily and smoothly

MINOS+ Status

Start Date/Time	End Date/Time	Near Detector		Far Detector	
		POT Fraction	Live Time Fraction	POT Fraction	Live Time Fraction
9/2/13 12:00 AM	9/9/13 12:00 AM	66.9%	98.8%	0.2%	1.6%
9/9/13 12:00 AM	9/16/13 12:00 AM	93.5%	92.7%	47.7%	46.8%
9/16/13 12:00 AM	9/23/13 12:00 AM	92.7%	92.3%	84.7%	81.0%
9/23/13 12:00 AM	9/30/13 12:00 AM	96.2%	95.3%	93.5%	94.1%
9/30/13 12:00 AM	10/7/13 12:00 AM	94.7%	94.4%	98.0%	98.3%
10/7/13 12:00 AM	10/14/13 12:00 AM	99.1%	85.0%	99.5%	87.4%
10/14/13 12:00 AM	10/21/13 12:00 AM	79.7%	89.7%	86.9%	99.9%
10/21/13 12:00 AM	10/28/13 12:00 AM	70.3%	58.5%	99.8%	95.8%
10/28/13 12:00 AM	11/4/13 12:00 AM	98.8%	97.8%	99.9%	99.5%
11/4/13 12:00 AM	11/11/13 12:00 AM	98.4 %	95.5%	95.7%	96.9%

- We are taking very good data – Thanks, AD!
- Regular shifts are underway